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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,572	09/25/2001	Ho-Jin Kweon	47227/DBP/Y35	3776

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EXAMINER

WILLS, MONIQUE M

ART UNIT PAPER NUMBER

1746

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/966,572	KWEON ET AL.	
	Examiner	Art Unit	
	Monique M Wills	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-11,13-20 and 22-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-11,13-20 and 22-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

A Request for Continued Examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 22, 2004 has been entered.

The following rejections are overcome:

- Claims 6, 11 & 17 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- Claims 1, 2, 6-8, 11, 13, 14, 17, 19, 20 & 22 under 35 U.S.C. § 103 (a) as being unpatentable over Lee et al. U.S. Pub. 2002/0076613.

Claims 1-4, 6-11, 13-20 and 22-28 are rejected as follows:

- Claims 1-4, 6-11, 13-20 and 22-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.
- Claims 1-4 & 6-11 under 35 U.S.C. § 103 (a) as being unpatentable over Amatucci et al., U.S. Patent 5,705,291.
- Claims 1, 3, 4, 6-11, 13-20 & 22 under 35 U.S.C. § 103 (a) as being unpatentable over Zhang et al., U.S. Pub. 2002/0119372.

- Claims 23-28 under 35 U.S.C. § 103 (a) as being unpatentable over Zhang et al., U.S. Pub. 2002/0119372, in view of Amatucci et al., U.S. Patent 5,705,291.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4, 6-11, 13-20 and 22-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The instant claims recite “metalloid oxide layers formed on the core” however, the specification does not provide support for *all* “metalloid oxides”. Although the disclosure supports specific metalloids including Boron, Silicon, Arsenic and Germanium (page 8, lines 14-16), metalloids such as Antimony, Tellurium, Polonium and Astatine are not described in the specification.

The instant claims recite “non-lithiated metal” however, the specification does not provide support for the *exclusion* of lithiated metal. On page 8, lines 14-15, the disclosure states that the coating element source may be *any* element capable of being dissolved in organic solvents or water. Zhang teaches that lithiated compounds such as LiBO_2 are soluble

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in water (§33). Therefore, the specification does not describe the omission of lithiated metal coatings.

Claim Interpretation

Because the term "metalloid oxide" is not described in the specification, the term will be interpreted as any metalloid containing oxide, such as LiBO_2 . This definition is consistent with the disclosure at page 8, lines 1-3, where it describes the surface treatment layer comprising B-included oxide.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 & 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amatucci et al., U.S. Patent 5,705, 291.

With respect to claims 1 & 7, Amatucci teaches a positive active material comprising a core lithiated compound of LiMn_2O_4 (col. 4, lines 5-10) and aluminum oxide formed on said core (col. 2, lines 20-25). In re claims 2 & 8, the lithiated compound, LiMn_2O_4 , represents formula 3, when $x=1$ and $z=0$. In re claims 3,4,9 & 10, the coating mixture includes 0.4 to 1.0 % by weight of the positive active material (col. 5, lines 25-35). With respect to claims 6 & 11, the oxide includes B_2O_3 (col. 5, lines 25-45) or Al_2O_3 (col. 2, lines 10-25). The coating

material reduces the surface area of the active material thereby, minimizing self-discharge of the battery during storage (col. 2, lines 1-5).

Amatucci is silent to at least two metal oxide layers formed on the core.

However, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ an additional metal oxide coating on the lithiated compound, because Amatucci teaches that said coating reduces the surface area of the active material, thereby minimizing self-discharge of the battery during storage.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3,4,6- 11, 13-20 & 22 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Zhang et al., U.S. Pub. 2002/0119372.

With respect to claims 1 & 7, Zhang teaches a LiCoO_2 core compound coated with LiBO_2 metalloid oxide (¶33). In re claims 3,4,9,10,15 & 16, cathode powder is treated with LiBO_2 in the range of 0.01 to 2 wt% based on the amount of active material (¶ 18). In re claims 6,11 & 17, the LiBO_2 metalloid oxide includes boron (¶28). Concerning claim 14, LiCoO_2 embraces formula (6), when M is Co, $x=1$ and $z=0$ (¶33). In re claims 13, 19 & 20, LiCoO_2 is coated by dissolving LiBO_2 in water and heating at 250°C for 1.5 hours under air

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(¶33). The coating material improves capacity fade rate characteristics of non-aqueous rechargeable lithium batteries (¶18).

Zhang is silent to: coating the lithiated compound with two metalloid oxide layers (claims 1 & 7); performing multiple coating/heat-treatment steps to form additional metalloid oxide layers on the core (claims 13 & 22); and the coating solution comprising two different metalloid oxides (claim 18).

However, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to repeat the coating/heat-treatment steps to form additional metal oxide coatings on the lithiated compound, because Zhang teaches that said coating improves capacity fade rate characteristics of non-aqueous rechargeable lithium batteries.

With respect to claim 18, it would have been obvious to one having ordinary skill in the art at the time the instant invention was made to employ a mixture of lithium transition metal oxides in the coating solution, because Zhang teaches that lithium transition metal oxides increase thermal stability. In other words, the skilled artisan would be motivated to employ more than one lithium transition metal oxide in the coating solution to further improve thermal stability.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-28 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Zhang et al., U.S. Pub. 2002/0119372 in view of Amatucci et. Al., U.S. Patent 5,705, 291.

With respect to claims 23 & 26, Zhang teaches a core comprising LiCoO_2 coated with lithium-boron oxide (¶ 33). In re claims 27 & 28, lithium borate is 0.01% to 0.15% by weight of the cathode powder (¶26).

Zhang is silent to coating the core with Al_2O_3 (claim 23), wherein the content of Al in the metal oxide layer ranges from 0.001 to 2 wt %(claims 24-25).

Amatucci teaches coating lithium oxide material with Al_2O_3 to reduce the surface area of the active material thereby, minimizing self-discharge of the battery during storage (col. 2, lines 2-30). With respect to claims 24-25, the coating material is present up to about 1 wt% of the cathode material (Examples 1-4).

It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to coat the lithiated compound of Zhang, with the Al_2O_3 of Amatucci, because the secondary reference teaches that coating lithium oxide materials with Al_2O_3 reduces surface area of the active material thereby, minimizing self-discharge of the battery during storage.

With respect to claims 23-25, Amatucci teaches that the coating material is present up to 1wt% of the cathodic material (Examples 1-4), which embraces the content of Al in the Al_2O_3 layer ranging from 2×10^5 by weight of the cathodic material.

In re claims 27-28, Zhang teaches that lithium borate is 0.01% to 0.15% by weight of the cathodic powder (¶26), which embraces the content of B in the metal oxide layer ranging from 2×10^5 by weight of the cathodic material.

Response to Arguments

Applicant asserts that Amatucci and Zhang, respectively, do not teach two layers over the lithiated compound, and prima facie obviousness was not established because the rejections were based on hindsight. Applicants may argue that the examiner's conclusion of obviousness is based on improper hindsight reasoning. However, "[a]ny judgement on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper." In re McLaughlin 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971). Therefore, claims 1-4 & 6-11 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Amatucci et al., U.S. Patent 5,705,291. Claims 1,3,4,6,7, 11, 13-15-19, 20 & 22 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Zhang et al., U.S. Pub. 2002/0119372. Claims 23-28 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Zhang et al., U.S. Pub. 2002/0119372, in view of Amatucci et al., U.S. Patent 5,705,291.

Applicant's arguments, see pages 9-10, filed July 22, 2004 with respect to claims 1, 2, 6-8,11, 13, 14, 17, 19, 20 & 22 under 35 U.S.C. § 103 (a) as being unpatentable over Lee et al. U.S. Pub. 2002/0076613 have been fully considered and are persuasive. The rejection has been withdrawn. However, the rejection will be reinstated once the new matter rejection is overcome.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Michael Barr, may be reached at 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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07/30/04


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